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FOOD & AGRICULTURE (1949) Department.

MS. SERIES.

G.O. No. Lr.No.1226

Dated 24th October 1949.

[Despatch Abstract.]

AGRICULTURE - Indian Council of Agricultural Research - Scheme for the improvement of Tuber crops - Forwarded.

Office of the Director of Agriculture,
Chepauk, Madras, dated 12-8-1949.

SCHEME FOR THE IMPROVEMENT OF CROPS.

INTRODUCTION.

The drive to make India self sufficient in food has not only given a great fillip to intensive cultivation of the staple food crops but has also focussed the attention of the authorities to encourage extensive cultivation and use of subsidiary food crops like Tapioca and Sweet Potatoes. Hitherto plant breeden bestowed their attention mainly to staple food crops like paddy, wheat, millets and commercial crops like sugarcane, cotton, tobacco etc. and neglected the tuber crops except potatoes. If the area and yield of the two largely cultivated tuber crops of this province namely sweet potatoes and tapioca are to be increased improvement of these two crops is to be taken up both by breeding and agronomy. Their area, district-wise is given in annexure I.

These two crops have some features in common. They are both of American origin and are propogated vegetatively. They yield heavily and contribute substantially to the caloritic requirements of the population. Tapioca is a long duration crop and grows well in well-drained soils. Its cultivation on a large scale is taken up as a rainfed crop in the West Coast and on a comparatively small scale in a few districts in the East Coast and Central districts under irrigation. On the other hand, sweet potatoe is cultivated in almost all the districts but the acreage is limited owing to the perishable nature of the tubers, loss by pests and diseases and the possibility of growing other remunerative crops under irrigation.

BREEDING:

The object is to evolve improved sweet potatoe strains with high yield, resistant to pests and diseases and capable of being grown in any season of the year. The average yield is estimated between 6000 to 8000 pounds of consumable fresh tubers. This yield is rather low as yields upto 20,000 are not uncommon. It is felt that the chief reason for the poor yield is due to the poor strains cultivated. The varieties cultivated at present were originally introduced from abroad and since then propagated vegetatively. There is therefore the possibility that they have deteriorated under vegetative propogation by the action of bacterial or virus disease and become easily susceptible to pests and diseases. It has been found that by hybridisation seedling production is easier in these crops. Such new seedlings forms can be selected (a) to show more pest and disease resistance or (b) to yield more under a given cultural condition or nature earlier where seasonal factors or crop rotation require strains of short duration. The existing varieties should also lend themselves to clonal selection as a first step in the improvement of the local varieties. There is bound to be a considerable reshuffling of genes by hybridisation as the cultivated strains are Heterozygous and the species are typically cross polinated. Preliminary trial at Coimbatore, have shown (a) that there is a positive correlation between vegetative vigour and yield in sweet potatoe, and (b) there is genetic variation as in the duration varieties arise either from shortage of water or from having to fit in sweet potatoe, between two other crops. In this crop, duration is intimately connected with seasonal factor and there are indications that the crop shows thermoperiodic response. It is desirable to evolve strains which can be grown easily in all seasons. Though there is no indication yet that such versatile strains can be built up, yet it is an aim worth striving for judging by the results of breeding in sugarcane, production of seedling forms and periodical replacement of existing clones by seedlings forms will be of aid in

checking loss by pests and diseases. The problem of weevil attack in sweet potatoes is more complex and requires detailed study. The indications are that the sugary varieties are not susceptible than less sugary varieties and that the insect attack develops as soon as the tubers are mature. The strains differ in the length of internodes, palatability cooking quality of tubers and liability to rot in storage. The breeding programme will take into account these ancillary characters.

4. Previous work: Actual breeding of sweet potato is new to this province. Some preliminary work was done on this crop at Bapatla. The work has been continued at Coimbatore, by the Cytogeneticist. During the flowering season in cool weather, hybridisations can be easily accomplished. These hybrid seeds germinate after sacrifying the seed coat. By repeated cuttings each seedling can be sufficiently multiplied in few months, and then tested for yield. As regards the botany of the crop the basic work on cytology of Ipomeas have been done by King and Bamford (2) in U.S.A. According to this research, 1, Batatas is probably a hexaploid evolved from interspecific hybrids among Neotropical Ipomeas. Further interspecific hybridisations are difficult to make and can give no immediate results. A recent cytological study of in Ipomea has been done in India at Benares Hindu University, by V.S.Rao (3) A general account of breeding in sweet potato is given by Mendiola (4) A general account of the crop as grown in U.S.A. is given by Thompson. (5) As the crop is grown throughout the tropical world and in some sub-tropical countries like New Zealand and Japan, a considerable amount literature on the culture and economics of the crop is available for reference.

(1) King J.R.and Bamford, R.C. :- Journal Hered. 1927, 28 P.279.
(2) Satyanarayana Rao, N:- Current Science . 1947, 16. P.156.
(3) Mendiola, N.B.:- A manual of Plant Breeding in the Tropics. 1926 Manila.
(4) Thompson, H.C.:- Sweet potato production and handling. 1929. New York and London.
(5) Principal Field. crops of Japan:- Foreign Agriculture, U.S.D.A. 1948. August.
(6) Sweet potato growing:- Farmers Bulletin 999, U.S.D.A.1919. Ditto Revised U.S.D.A. 1932.
(7) Sweet potato crop in Konkan:- Agri.Department Botany Leaflet 2. 1923.
(8) Sweet potato in Hawai:- Hawai Experiment Station, Bulletin No.50. 1923.

(6) Venue of the proposed Scheme:-

The breeding work of the two crops will be conducted at Coimbatore Central Farm under the immediate charge of the Cytogenticist and under the control of the Principal. As the area in the Central Farm will not be sufficient to conduct yield trials of strains and other agronomic study, they will have to be taken up at Pattambi and Nileshwar in the West Coast where suitable land can be leased for small consideration and where these crops are intensively cultivated.

PROGRAMME OF WORK.

(1) Survey and study of local varieties of both Sweet Potato and Tapioca.
(2) Selection (cloral) in the local varieties of sweet potatoes and yield trials of the selection.
(3) Hybridisation and evolution of strains for yield resistant to pests and diseases and suitable for cultivation in all the seasons.

(4) Agronomic trials - Manurial, Seasonal; spacing - trial of insecticides.

(5) Seasonal planting trials in some of the Agricultural Stations to find if sweet potatoe and tapioca can be taken in the second crop season or as an early S.W.Monsoon for tubers.

STAFF:

The extra staff required for the scheme is as follows:-

1. Science Assistant is required at Coimbatore to take up fundamental study, hybridisation of preliminary selection.

2. Assistants as Nileshwar and Pattambi one at each of the station to conduct survey and varietal and agronomic, experiments.

3. Fieldmen, at Coimbatore and one each at Pattambi and Nileshwar to assist the assistants.

3 Maistries (one in each Station).

FINANCE:

Details of the financial implication of the scheme are given in Annexure II. The total cost of the scheme for three years comes to Rs.7,250/- Non-recurring and Rs.70,900/- recurring.

APPENDIX I

AREA UNDER MAJOR (ROOT-CROPS) IN THE VARIOUS DISTRICTS OF THE MADRAS PRESIDENCY IN 1947-1948.

District.	Area under sweet potatoe in acres.	Area under Tapioca in acres.	Area under Potatoe in acres.
Vizag	2064 acres	3191 acres	153 acres
East Godavari	2021 "	1037 "	
West Godavari	660 "	--	
Krishna	---	--	
Guntur	275 "	--	
Kurnool	286 "	--	
Bellary	122 "	--	
Anantapur	156 "	--	
Cuddapah	879 "	--	
Nellore	348 "	--	
Chingleput	172 "	--	
South Arcot	713 "	1313 acres	
Chittoor	18 "	--	1 acre
North Arcot	236 "	--	---
Salem	2311 "	3206 "	236 acres
Coimbatore	1317 "	174 "	--
Trichy	2841 "	166 "	--
Tanjore	410 "	504 "	--
Madurai	1438 "	40 "	262 acres
Ramnad	550 "	--	--
Tirunelvelli	1757 "	--	--
Malabar	2386 "	23,179 "	--
South Kanara	14,469 "	82 "	--
The Nilgiris	11 "	71 "	14,864 "
Total	33,660 "	32,954 "	15,516 "

ANNEXURE II.

FINANCIAL STATEMENT.

RECURRING.	1st year.	2nd year.	3rd year.	4th year. Total.
Pay of Staff and Establishment.				
2 Assistant at Coimbatore one at Pattambi and one at Nileshwar on Rs.100-5-200	3600	3780	3960	11,340
2 Fieldmen at Coimbatore one at Pattambi and one at Nileshwar on Rs.45-60.	1620	1692	1764	5,076
3 Maistries (one in each station) Rs.20-1-30.	720	756	792	2,268
Typewriting Allowance.				
Allowances:				
(a) Dearness Allowance @ Rs.17½% plus Rs.8/- for 4 Assistants	864	936	972	2,772
For 3 Fieldmen at Rs.22/-	792	792	792	2,376
3 Maistries at Rs.19/-	684	684	684	2,052
(b) House Rent Allowance.				
1 Assistant at Coimbatore at Rs.15/- p.m.	180	180	180	540
1 Fieldmen, 1 maistry Rs.6/8/-	156	156	156	468
Travelling allowance for 3 Stations.	1500	1000	1000	3,500
AT COIMBATORE:				
Cost of experimental cultivation.	1500	1500	1500	4,500
Other Contingencies	250	250	250	750
AT PATTAMBI.				
Lease amount for 10 acres at Rs.125/-	1250	1250	1250	3,750
Working expenses	2000	2000	2000	6,000
Petty constructions and Repairs.	..	250	250	500
Other contingencies	250	250	250	750
AT NILESHWAR:				
Lease Amount for 10 acres at Rs.150/- 5 acres dry and 5 acres wet at 250	..	15,366	15,776	15,800	46,642

Working expenses	2000	2000	2000	6,000
Petty construction and Repairs. ..		250	250	500
Other contingencies	250	250	250	750
Total recurring expenditure.	19,616	19,976	20,200	59,892 or (59,900 roundly)

NON RECURRING EXPENDITURE.

AT COIMBATORE.				
Apparatus and materials	500	--	--	500
Dead Stock	250	--	--	250
Furniture	300	--	--	300
AT PATTAMBI				
Dead Stock	500	100	00	700
Furniture	100	--	--	100
Construction of temporary dry floor	300		--	300
Shed	500		--	500
Fencing the area	1000		--	000
Lay out terraces	500		--	500
AT NILESHWAR.				
Dead Stock	500	100	100	700
Furniture	100	--	--	100
Construction of temporary dry floor	300	--	--	300
Construction of temporary shed	500	--	--	500
Fencing the area	1000	--	--	000
Lay out terraces	500	--	--	500
Total Non-Recurring Expenditure	6850	200	200	7250

RECEIPTS.

At Coimbatore (2 acres)	100	100	100	300
At Pattambi (10 acres)	1000	1000	1000	3000
At Nileshwar (10 acres)	1000	1000	1000	3000
Total Receipts	2100	2100	2100	6300

P.T.O.

Sd

For Director of Agriculture

GOVERNMENT OF MADRAS.
FOOD AND AGRICULTURE DEPARTMENT.

Letter Mx.No.1226.

From

The Secretary to Government.

To

The Secretary to the Indian Central Agricultural Research, NEW DELHI.

Dated Fort St. George, Madras, the 24th October 1949.

Sir,

Sub: Agriculture - Indian Central Agricultural Research - Scheme for the improvement of tuber crops.

In his note on the programme of research for the production of food crops communicated with the Councils letter No.F.64(1)/47-[illegible]0, dated 28-10-1948, the Agricultural Commissioner to the Government of India has suggested inter alia, that investigations should be carried out for the greater production of root crops other than potatoes in area where these crops can be grown economically. With reference to this recommendation I am directed to forward herewith a research scheme prepared by the Director of Agriculture, Madras, for the improvement of two of the Chief tuber crops i.e. sweet potatoes and tapioca for the approval of the Indian Central Agricultural Research. The scheme is estimated to cost Rs.59,000/- recurring for three years and Rs.7,250/- non-recurring. The receipts in the scheme for 3 years are estimated at Rs.6,300/-. The Government of Madras consider that the recurring expenditure and also the receipts in the scheme should be shared equally between the Provincial Government and the Council, the non-recurring expenditure being borne in full by this Government. In view of the importance of the scheme the Government of Madras desire to implement the scheme as expeditiously as possible. I am to request that the concurrence of the Council to the proposal may kindly be communicated to this Government at an early date.

Yours faithfully,

Sd/-
Secretary to Government.

Copy to/the Director of Agriculture. He is requested to submit the usual number of printed copies of the scheme at an early date.

(True copy)

Superintendent,
Madras Record Office.

KRVD.11.7.